

Rudimentary roof catchments provide drinking water for some households in the United States.

# Appendix B—Summary of Findings

#### **Needs for Water Systems in the States\***

Exhibit B-1—Total Need by Category

Exhibit B-2—Current Need by Category

Exhibit B-3—Total Need by System Size

Exhibit B-4—Current Safe Drinking Water Act Need

Exhibit B-5—Total SDWA and SDWA-Related Need

#### **Needs for American Indian and Alaska Native Water Systems**

Exhibit B-6—Total Need for American Indian and Alaska Native Water Systems by EPA Region

Exhibit B-7—Need by Category for American Indian and Alaska Native Water Systems

Exhibit B-8—Total SDWA and SDWA-Related Need for American Indian and Alaska Native Water Systems

<sup>\*</sup> Needs for water systems in the States do not include needs for American Indian and Alaska Native water systems. Needs for Palau (approximately \$17.2 million) are not included in this report because Palau is not eligible to participate in the Drinking Water State Revolving Fund.

Distribution and transmission line breaks result in loss of service and can lead to contamination. Breaks can sometimes be dramatic. The road collapsed under these cars, at right, after a water main break in Fort Lauderdale. Below, a work crew repairs a water main break in San Francisco.





## Exhibit B-1: (facing page)

Total Need by Category

The total infrastructure need for water systems regulated by the States is \$137.1 billion.

Total

1,907.7

137,071.5

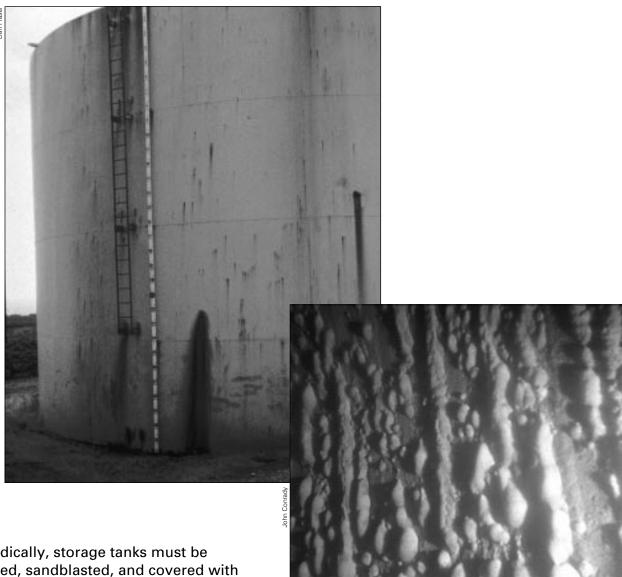
10,873.9

	Fotal Need by Cate	gory (20-year ne	ed in millions	or Jan. 95 d	ollars)	
State	Transmission and Distribution	Treatment	Storage	Source	Other	Total
Alabama	869.8	483.4	189.9	111.2	4.9	1,659.
Alaska	478.3	143.5	93.3	49.5	6.6	771.
Arizona	522.5	640.7	112.4	70.9	7.3	1,353.
Arkansas	1,012.6	780.8	144.2	83.0	3.9	2,024.
California	8,833.8	4,979.1	1,544.1	2,812.3	644.5	18,814.
Colorado	929.2	631.7	149.3	199.4	39.5	1,949.
Connecticut	805.6	352.3	104.0	83.6	11.2	1,356.
Delaware	248.3	62.4	30.3	27.6	3.0	371.
District of Columbia	110.8	12.7	8.2	0.0	0.0	131.
Florida	2,170.5	1,317.3	402.1	362.5	82.9	4,335.
Georgia	1,897.7	895.4	229.8	265.5	6.4	3,294.
Hawaii	137.3	152.4	46.9	93.1	1.2	430.9
ldaho	337.9	111.2	70.1	69.3	1.7	590.:
Illinois	3,067.9	1,502.0	469.8	228.9	80.9	5,349.
Indiana	925.2	470.9	173.5	79.7	25.4	1,674.
lowa	1,612.9	368.4	167.5	91.6	15.5	2,255.
Kansas	1,181.5	521.7	169.3	97.3	6.6	1,976.
Kentucky	1,349.9	575.9	136.7	152.1	9.6	2,224.:
Louisiana	1,046.5	573.7	190.7	131.3	11.2	1,953.
Maine	545.6	199.1	83.3	32.5	4.9	865.
Maryland	721.3	302.7	143.5	69.6	47.7	1,284.
Massachusetts	3,636.8	1,536.8	442.0	281.5	47.9	5,945.
Michigan	2,751.1	1,252.3	222.7	171.9	38.9	4,436.
Minnesota	1,374.4	537.0	222.6	275.4	28.3	2,437.
Mississippi	1,031.2	251.4	170.4	118.2	4.9	1,576.
Missouri	938.1	520.8	242.7	113.8	63.5	1,878.9
Montana	378.5	165.2	71.6	44.8	2.5	662.0
Nebraska	471.3 252.6	306.4 162.7	78.1 42.0	90.7	6.3	952.9
Nevada New Hampshire	402.6	170.0	94.3	58.6 47.9	9.0 2.2	524.9 717.0
New Jersey	2,469.8	658.2	290.5	163.5	31.2	3,613.
New Mexico	589.0	168.9	95.2	176.3	13.3	1,042.
New York	6,600.3	2,057.0	535.4	760.0	129.8	10,082.
North Carolina	1,491.8	738.3	255.4	218.8	9.8	2,714.
North Dakota	321.4	179.7	53.5	30.1	2.2	586.9
Ohio	2,680.6	1,316.7	538.1	271.2	99.7	4,906.3
Oklahoma	1,083.1	670.7	177.8	85.1	14.7	2,031.
Oregon	1,063.9	550.6	266.1	255.8	11.8	2,148.
Pennsylvania	2,854.7	1,269.2	428.1	179.1	25.0	4,756.
Puerto Rico	1,172.6	591.2	217.5	271.9	0.8	2,254.
Rhode Island	429.2	170.5	31.3	17.9	7.7	656.
South Carolina	718.9	511.9	122.4	103.4	4.2	1,460.
South Dakota	306.4	141.4	63.8	53.0	4.2	568.
Tennessee	972.7	661.2	179.6	44.7	13.0	1,871.
Texas	7,157.6	3,078.5	995.5	1,018.1	114.9	12,364.
Utah	536.4	316.1	105.7	75.1	12.1	1,045.
Vermont	267.8	108.9	48.8	31.6	2.2	459.
Virginia	1,416.9	965.8	218.7	275.6	66.9	2,943.
Washington	2,345.8	732.0	607.1	240.5	105.4	4,030.
West Virginia	576.7	340.8	105.7	63.7	3.3	1,090.
Wisconsin	1,025.3	525.4	177.5	125.2	13.9	1,867.
Wyoming	213.4	113.2	29.4	33.0	1.8	390.
Subtotal	76,336.0	35,846.0	11,788.6	10,807.3	1,906.2	136,684.2
American Samoa	12.2	4.8	3.3	1.9	0.3	22.
Guam	33.3	5.6	10.6	57.1	0.0	106.
Northern Mariana Is.	10.5	18.7	2.4	2.6	1.0	35.
Virgin Islands	139.5	44.4	34.0	5.1	0.2	223.
Subtotal	195.4	73.4	50.4	66.6	1.5	387.

35,919.4

11,839.0

76,531.5



Periodically, storage tanks must be drained, sandblasted, and covered with epoxy paint. If this refurbishment is not done, water quality can deteriorate and microbiological contamination can occur. Pictured above is an outside view of a storage tank needing rehabilitation. The insert is an underwater photo of the inside wall of a water storage tank that is overdue for rehabilitation. These are rust deposits that can harbor bacteria and lower water quality. Over one third of the water systems in the country need to rehabilitate storage tanks.

### Exhibit B-2: (facing page)

Current Need by Category

Approximately \$75.7 billion is for projects needed now to protect public health at water systems regulated by the States.

	- · · ·						
State	Transmission and Distribution	Treatment	Storage	Source	Other	Total	
Alabama	478.4	101.4	134.6	80.4	0.0	794.	
Alaska	335.3	43.0	65.8	37.1	0.0	481.	
Arizona	382.4	375.5	91.0	49.7	0.0	898.	
Arkansas	789.6	427.1	108.5	50.2	0.0	1,375.	
California	5,522.9 487.1	2,085.2 233.7	978.9	2,465.7	1.2	11,053.	
Colorado Connecticut	265.7	233.7 82.8	86.3 47.3	117.0 38.9	0.0	924. 434.	
Delaware	151.3	6.6	47.3 17.1	36.9 17.0	0.0	434. 192.	
District of Columbia	101.1	0.0	8.2	0.0	0.0	109.	
Florida	1,618.1	397.0	333.5	305.3	0.0	2,654.	
Georgia	1,282.2	336.5	148.9	145.2	0.0	1,912.	
Hawaii	108.1	85.1	43.3	90.9	0.0	327.	
ldaho	188.7	26.4	40.6	43.4	0.0	299.	
Illinois	1,486.2	330.7	239.6	183.5	0.0	2,240.	
Indiana	612.0	116.9	124.3	60.9	0.0	914.	
lowa	1,181.9	70.5	93.1	48.2	0.0	1,393.	
Kansas	866.2	256.3	131.8	60.1	0.0	1,314.	
Kentucky	674.4	134.2	90.9	38.5	0.0	938.	
Louisiana	729.7	191.5	141.9	85.4	0.0	1,148.	
Maine	392.4	66.9	52.2	19.8	0.0	531.3	
Maryland	543.6	143.2	98.7	39.6	0.0	825.	
Massachusetts	2,301.7	399.3	404.5	219.7	0.0	3,325.	
Michigan	1,798.8	412.4	135.7	120.0	0.0	2,466.	
Minnesota	313.9	55.9	115.9	113.8	0.0	599.	
Mississippi	671.7	29.0	127.0	84.0	0.0	911.	
Missouri Montana	545.2 190.3	136.5 35.9	175.1 40.3	85.5 23.4	0.0	942. 290.	
Nebraska	254.8	176.7	48.2	69.8	0.0	549.	
Nevada	145.0	53.6	29.2	17.3	0.0	245.:	
New Hampshire	210.6	42.8	34.9	22.6	0.0	310.	
New Jersey	1,409.1	149.0	153.8	94.9	0.0	1,806.	
New Mexico	475.7	92.6	75.3	164.4	0.0	807.	
New York	4,639.1	1,061.9	392.6	679.6	0.0	6,773.	
North Carolina	1,134.2	176.6	191.1	152.2	0.0	1,654.	
North Dakota	114.0	37.9	35.8	12.5	0.0	200.	
Ohio	1,419.8	418.9	356.8	182.4	0.0	2,377.	
Oklahoma	815.7	278.6	139.1	66.4	0.0	1,299.	
Oregon	525.0	178.2	161.9	89.5	0.0	954.	
Pennsylvania	1,924.1	388.8	327.9	139.0	0.0	2,779.	
Puerto Rico	680.4	312.0	67.2	258.4	0.0	1,317.	
Rhode Island	187.3	47.6	29.1	14.7	0.0	278.	
South Carolina	382.7	173.3	87.5	50.0	0.0	693.	
South Dakota	156.5	37.2	29.8	23.0	0.0	246.	
Tennessee	525.3	223.6	98.7	32.1	0.0	879.	
Texas	4,103.7	1,106.2	576.3	413.0	0.0	6,199.	
Utah	280.3 161.1	74.8 37.8	69.9	59.7	0.0	484.	
Vermont Virginia	1,097.8	37.8 454.7	32.6 166.7	25.0 164.7	0.0	256. 1,884.	
Washington	1,336.0	317.8	459.5	174.2	0.0	2,287.	
West Virginia	429.1	158.8	82.8	54.0	0.0	724.	
Wisconsin	488.8	164.1	132.9	83.9	0.0	869.	
Wyoming	132.6	38.2	20.9	29.3	0.0	221.	
Subtotal	47,047.9	12,781.0	7,875.6	7,696.4	1.2	75,402.	
American Samoa	9.5	1.7	2.7	1.6	0.0	15.	
Guam	31.1	0.7	10.4	57.0	0.0	99.	
Northern Mariana Is.	7.7	1.3	2.3	2.5	0.0	13.	
Virgin Islands	108.6	12.2	24.0	3.3	0.0	148.	
Subtotal	156.9	15.9	39.4	64.4	0.0	276.0	
	47,204.8	12,796.9	7,915.0	7,760.7	1.2	75,678.	

New York City is in the process of constructing tunnels designed to add redundancy and deliver hundreds of millions of gallons of water per day to city residents. Workers, at right, are drilling holes for dynamiting. A worker, below, inspects a recently concreted tunnel to ensure it is ready to be put on line. Redundancy will help the city ensure an adequate water supply in the event of a tunnel failure and will enable inspections and maintenance of the city's two other main tunnels.





### **Exhibit B-3: (facing page)**

Total Need by System Size
The largest share of the total need is for infrastructure improvements at large water systems, those serving more than 50,000 people.

Subtotal

Total

Virgin Islands

223.1

387.3

137,071.5

111.3

138.9

37,208.4

inking Water Infrastruct	ure Needs Survey			Appendix B E
Exhibit B-3: Total	Need by System Size	e (20-year need in milli	ons of Jan. '95 dollar	s)
State	Large Systems	Medium Systems	Small Systems	Total
Alabama	387.4	687.9	584.0	1,659
Alaska	90.7	136.4	544.1	77
Arizona	584.5	344.2	425.0	1,35
Arkansas	257.6	1,101.5	665.4	2,024
California	13,475.1	3,306.0	2,032.9	18,814
Colorado	679.1	627.6	642.4	1,949
onnecticut	541.7	466.1	348.9	1,350
elaware	189.2	21.7	160.7	37
istrict of Columbia	131.6	0.0	0.0	13
lorida	1,960.9	1,182.8	1,191.6	4,33
Georgia	946.3	1,429.8	918.8	3,29
lawaii	17.8	326.2	86.9	430
daho	81.4	105.2	403.6	590
linois	1,791.9	2,178.4	1,379.4	5,349
ndiana	337.2	656.9	680.6	1,67
owa	306.9	1,168.2	780.8	2,25
ansas	519.3	614.5	842.7	1,97
entucky	612.2	1,015.7	596.3	2,22
ouisiana	473.2	659.4	820.9	1,95
laine	230.2	326.6	308.6	86
	746.5	273.9		1,28
laryland			264.4	
lassachusetts	3,266.8	2,425.2	253.0	5,94
lichigan	1,817.4	1,711.4	908.1	4,43
linnesota	519.4	1,257.6	660.7	2,43
/lississippi	25.0	573.8	977.3	1,57
lissouri	476.4	369.9	1,032.6	1,87
lontana	82.4	203.7	376.6	66
ebraska	230.6	250.1	472.2	95
evada	287.1	90.7	147.1	52
ew Hampshire	72.5	225.0	419.4	71
ew Jersey	1,905.4	1,383.2	324.6	3,61
ew Mexico	273.3	426.1	343.3	1,04
ew York	6,388.4	1,645.4	2,048.7	10,08
orth Carolina	621.7	823.2	1,269.3	2,7
orth Dakota	129.5	227.5	229.9	58
hio	2,252.3	1,521.5	1,132.5	4,90
klahoma	399.5	543.9	1,088.0	2,03
regon	655.6	828.2	664.4	2,14
ennsylvania	1,896.9	1,258.1	1,601.0	4,75
ierto Rico	1,103.4	786.2	364.3	2,25
node Island	449.6	159.9	47.1	65
outh Carolina	350.4	674.8	435.6	1,46
outh Dakota	76.7	176.4	315.6	56
nnessee	231.9	1,162.0	477.4	1,87
exas	6,195.8	2,782.1	3,386.7	12,36
ah	448.2	317.1	280.0	1,04
ermont	21.2	129.9	308.2	4!
rginia	1,626.8	589.8	727.4	2,9
ashington	1,282.9	1,232.0	1,515.9	"4,03
est Virginia	114.8	281.5	693.8	1,09
isconsin	725.4	456.1	685.7	1,80
yoming	91.8	94.1	204.8	39
Subtotal	58,379.6	41,235.2	37,069.5	136,68
merican Samoa	30,373.0	6.2	16.2	
	70.1			2
Jam	79.1	20.0	7.6	10
orthern Mariana Is.	_	31.4 111 7	3.7	3
irgin Islands	_	111 7	111 3	22

111.7

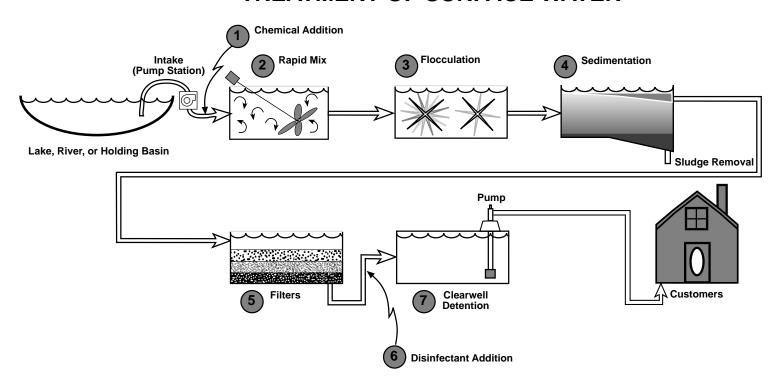
169.3

41,404.5

79.1

58,458.7

#### TREATMENT OF SURFACE WATER



Usually, surface water is treated using a conventional filtration process designed to remove suspended solids, organic and inorganic contaminants, pathogenic organisms, and tastes and odors. Almost 40 percent of water systems with surface water sources have a need to build, rebuild, or improve surface water treatment plants. This schematic shows how these plants work.

- Chemical Addition: Chemicals, usually coagulants and disinfectants, are added to untreated surface water to make contaminants, including pathogenic organisms, easier to remove.
- Rapid Mix: In this stage, chemicals are quickly blended with untreated water to facilitate chemical reactions.
- Flocculation: The water is slowly mixed in flocculation basins. The slow, gentle mixing allows chemically destabilized particles to come into contact with each other so that larger, more easily removable "floc" particles are formed.
- Sedimentation: "Floc" particles are allowed to settle out of the water and are subsequently removed as "sludge." Many of the contaminants from the

source water and chemicals added in Step 1 are removed in this process. The cleaner, "clarified" water is then transferred to the filters.

- Filters: The remaining "floc"
  particles are removed as the
  water passes through the
  granular media of the filters.
  The clean, filtered water is
  collected in piping manifolds
  beneath the filters.
- Disinfectant Addition:
   Disinfectant (usually chlorine) is added to the filtered water as it is transferred to the clearwell or finished water storage.
- 7. Clearwell Detention: The water is held in the clearwell long enough to allow the disinfectant to inactivate any remaining pathogens. A disinfectant residual is maintained in the distribution system to protect against contamination that might occur after the water has left the treatment plant.

#### Exhibit B-4: (facing page)

Current Safe Drinking Water Act Need

Approximately \$12.1 billion is needed now to meet current SDWA requirements. Eighty-four percent of this need is to protect against microbiological contaminants that pose an acute risk to health.

# Exhibit B-5: (pages B-10 and B-11)

Total SDWA and SDWA-Related Need

Over the next 20 years, approximately \$16.2 billion is for compliance with existing SDWA regulations, and \$14.0 billion is for compliance with proposed SDWA regulations. Another \$35.7 billion is for SDWA-related need.

State	SWTR	TCR	Nitrate	Lead and Copper Rule	Phase I, II, V	TTHMs	Other*	Total
Alabama	63.6	0.4	0.0	4.1	0.4	3.1	2.9	74.6
Alaska	27.3	1.7	0.2	6.8	0.0	0.0	0.5	36.6
Arizona	181.4	1.5	6.6	5.0	0.0	0.0	0.4	195.0
Arkansas	376.9	8.0	0.1	2.2	0.4	32.8	3.0	416.1
California	1,318.7	6.2	171.8	15.0	232.6	67.6	4.1	1,816.0
Colorado	213.4	1.2	0.1	2.0	0.3	0.1	2.3	219.4
Connecticut	72.1	1.4	0.2	4.3	1.5	0.0	0.8	80.3
Delaware	2.8	0.6	0.1	1.1	0.0	0.0	0.1	4.6
District of Columbia	0.0	0.0	0.0	0.0	0.0 2.0	0.0	0.0	0.0
Florida	266.9 301.0	3.7 2.7	0.4	42.3 6.1	0.2	12.2 0.1	0.6 1.6	328.1 311.9
Georgia Hawaii	301.0 37.9	0.2	0.0	0.4	0.2	0.0	0.0	38.7
Idaho	17.2	1.5	0.0	0.4	0.4	0.0	0.6	20.7
Illinois	207.2	2.3	13.1	62.1	28.9	2.3	13.9	329.9
Indiana	98.5	2.7	0.2	26.5	7.8	0.1	1.2	136.9
lowa	61.7	2.0	0.2	2.4	0.4	0.1	1.1	67.8
Kansas	226.7	1.2	7.3	2.3	3.7	0.4	3.2	244.8
Kentucky	108.8	0.3	0.0	1.8	0.6	0.3	4.9	116.7
Louisiana	69.9	2.9	0.2	6.5	47.7	0.7	48.2	176.1
Maine	52.8	0.7	0.1	3.4	0.1	0.1	1.3	58.5
Maryland	118.1	0.9	0.1	0.6	0.0	0.0	1.1	120.8
Massachusetts	378.8	0.6	0.1	32.0	18.1	0.6	0.9	431.0
Michigan	379.0	2.4	0.2	29.1	1.6	0.1	2.2	414.7
Minnesota	37.5	8.4	0.8	8.5	0.0	0.0	0.4	55.8
Mississippi	1.1	4.4	0.2	2.2	0.0	0.0	0.2	8.0
Missouri	104.2	3.4	0.2	4.0	4.4	23.8	2.5	142.6
Montana	26.7	1.3	0.2	0.9	0.1	0.0	0.6	29.8
Nebraska	156.1	1.1	8.4	2.3	1.1	0.0	0.2	169.2
Nevada	31.1	0.5	0.1	0.6	0.3	0.5	8.4	41.5
New Hampshire New Jersey	30.0 45.9	1.7 0.9	0.2	1.1	1.7 11.2	0.1	1.2	36.0 175.6
New Mexico	45.9 28.1	1.3	0.1	3.6	0.0	0.3	0.5	33.7
New York	1,064.3	5.4	0.2	139.9	27.3	1.1	6.1	1,245.0
North Carolina	137.0	4.1	0.5	5.6	0.4	1.0	3.8	152.4
North Dakota	15.8	0.5	0.1	0.7	0.0	13.1	0.4	30.6
Ohio	358.1	2.4	0.3	221.1	14.3	0.1	2.5	598.7
Oklahoma	233.5	1.1	3.0	11.2	0.6	3.2	10.4	263.0
Oregon	143.4	3.0	0.2	7.4	6.7	0.1	2.3	163.1
Pennsylvania	315.8	4.1	0.5	77.8	1.3	0.3	4.7	404.4
Puerto Rico	285.9	0.3	0.0	1.9	0.2	8.5	1.7	298.6
Rhode Island	40.1	0.1	0.0	4.3	0.0	0.0	0.1	44.8
South Carolina	154.7	3.2	0.1	6.8	0.3	0.2	1.6	166.9
South Dakota	26.5	8.0	1.9	1.7	0.1	0.0	0.7	31.7
Tennessee	159.8	0.3	0.0	2.3	0.3	0.2	2.6	165.5
Texas	999.6	6.6	0.7	12.4	1.2	6.5	10.6	1,037.6
Utah	51.8	0.6	5.9	0.6	0.6	0.0	7.4	66.9
Vermont	29.5	0.8	0.1	2.0	0.1	0.0	0.8	33.4
Virginia	335.6	2.2	0.3	20.1	0.2	0.2	2.2	360.8
Washington	269.0	7.5	0.6	10.6	0.4	0.2	3.2	291.5
West Virginia Wisconsin	125.5	3.3	0.1	5.7 20.0	2.5	0.3	4.6	141.9 172.7
Wyoming	143.4 36.7	2.8 0.4	0.2 0.1	20.0 0.5	5.8 0.1	0.0 0.0	0.4 0.6	172.7 38.3
	9,967.8							
Subtotal American Samoa	1.4	<b>110.2</b>	<b>227.6</b> 0.0	<b>936.4</b> 0.0	<b>428.1</b>	<b>180.5</b>	188.7 0.0	<b>12,039.3</b>
Guam	0.5	0.0	0.0	0.0	0.0	0.0	0.0	
Northern Mariana Is.	0.5 1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.6 1.2
Virgin Islands	10.2	0.0	0.0	1.2	0.0	0.0	0.0	11.4
Subtotal	13.3	0.0	0.0	1.2	0.0	0.0	0.1	14.7

<sup>\*</sup> Includes arsenic, barium, cadmium, chromium, fluoride, mercury, selenium, combined radium-226, -228, and gross alpha particle activity.

Exhibit B-5: Total SDWA and SDWA-Related Need (20-year need in millions of Jan. '95 dollars) **Existing Regulations** Lead and State **SWTR TCR Nitrate** Phase I, II, V **TTHMs** Other\* Subtotal Copper Rule Alabama 122.0 2.1 0.0 3.1 2.9 134.8 Alaska 33.4 2.0 0.2 11.4 0.0 0.0 0.5 47.6 Arizona 182.8 1.7 6.6 5.4 0.0 0.0 0.4 197.1 0.4 32.8 3.0 511.1 471.4 1.0 0.1 2.5 Arkansas 18.1 250.4 79.4 4.1 California 1.694.1 7.6 172.0 2.225.8 Colorado 277.3 1.4 0.1 4.8 0.3 0.1 2.3 286.4 Connecticut 111.7 1.6 0.2 10.8 1.5 0.0 8.0 126.6 Delaware 6.3 0.7 1.6 1.3 0.0 0.0 0.1 9.9 District of Columbia 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Florida 283.3 4.5 0.4 43.5 2.0 12.2 0.6 346.5 Georgia 383.6 3.2 0.3 10.5 0.2 0.1 1.6 399.5 38.1 0.5 0.1 0.0 0.0 38.9 Hawaii 0.2 0.0 Idaho 28.5 0.2 1.2 0.4 0.0 0.6 32.7 1.7 6.9 85.4 55.1 13.9 497.0 Illinois 320.2 13.1 2.3 108.9 6.2 0.2 27.9 7.8 0.1 1.2 152.2 Indiana Iowa 114.6 2.4 0.2 3.2 0.4 0.1 1.1 122.0 Kansas 249.0 1.4 7.3 6.0 3.7 0.4 3.2 271.1 Kentucky 180.2 0.3 0.0 32.2 0.6 0.6 4.9 218.9 Louisiana 85.5 3.5 0.2 7.2 47.7 1.8 48.2 194.0 5.9 Maine 96.3 8.0 0.1 0.1 0.1 1.3 104.6 1.0 1.0 0.0 0.0 1.1 Maryland 145.4 0.1 148.7 894.4 48.8 18.1 0.6 Massachusetts 0.7 0.1 0.9 963.6 Michigan 412.1 2.9 0.2 102.3 7.8 0.1 2.2 527.6 96.9 8.8 0.8 188.1 0.0 0.0 0.4 295.1 Minnesota Mississippi 7.5 0.2 4.0 0.0 0.0 0.2 13.0 1.3 Missouri 146.0 3.9 0.2 4.7 4.4 23.8 2.5 185.6 Montana 66.3 1.6 0.2 1.4 0.1 0.0 0.6 70.0 168.7 0.0 0.2 Nebraska 1.4 8.4 4.3 1.1 184.1 34.2 0.6 0.7 9.5 0.5 8.4 Nevada 0.1 54.1 59.2 1.2 New Hampshire 1.9 0.2 2.1 1.7 0.1 66.3 New Jersey 62.0 1.1 0.1 124.1 11.2 0.3 13.4 212.1 New Mexico 38.7 0.2 0.0 0.0 0.5 44.8 1.5 3.9 New York 1,142.2 217.4 47.0 6.4 0.9 1.1 6.1 1,421.1 North Carolina 0.5 194.5 4.8 13.7 0.4 1.0 3.8 218.6 North Dakota 67.8 0.6 0.1 1.0 0.0 13.7 0.4 83.5 Ohio 524.4 2.9 0.3 229.4 14.3 0.1 2.5 773.8 Oklahoma 304.4 1.3 11.4 12.3 0.6 3.2 10.4 343.6 Oregon 296.3 3.3 0.2 7.8 6.7 0.1 2.3 316.6 Pennsylvania 353.7 4.9 0.5 288.3 4.3 0.3 4.7 656.7 0.2 327.8 Puerto Rico 314.9 0.4 0.0 2.0 8.5 1.7 Rhode Island 63.4 0.2 0.0 45.5 0.0 0.0 0.1 109.2 South Carolina 200.2 3.4 0.1 7.1 0.3 0.2 1.6 212.9 South Dakota 53.6 0.9 1.9 1.9 0.1 0.0 0.7 59.2 230.0 10.0 Tennessee 0.4 0.0 2.5 0.2 2.6 245.7 Texas 1,371.6 8.1 0.7 14.7 1.6 6.5 10.6 1,413.8 Utah 63.9 8.0 5.9 0.6 0.0 7.4 80.0 1.4 Vermont 33.3 1.0 0.1 2.2 0.1 0.0 8.0 37.5 374.8 20.6 Virginia 2.6 0.3 0.2 0.2 2.2 400.9 Washington 318.6 8.5 0.6 12.2 0.4 0.2 3.2 343.7 West Virginia 144.1 3.4 0.1 5.9 2.5 0.3 4.6 160.8 Wisconsin 169.7 3.2 0.2 110.6 5.8 0.0 0.4 290.0 Wyoming 40.4 0.5 0.1 0.6 0.1 0.0 0.6 42.2 520.4 13,174.3 140.0 237.7 1,764.5 194.3 188.7 16,219.8 Subtotal American Samoa 0.0 1.8 0.0 0.0 0.0 0.0 0.0 1.9 0.6 0.0 0.0 0.0 Guam 0.0 0.0 0.0 0.7 Northern Mariana Is. 0.0 0.0 1.2 0.0 0.0 0.0 0.0 1.2 Virgin Islands 14.0 0.0 0.0 1.2 0.0 0.0 0.0 15.2 Subtotal 17.6 0.0 0.0 1.2 0.0 0.0 0.1 19.0

1,765.7

520.4

194.3

16,238.8

188.8

237.7

140.0

13,191.9

Total

<sup>\*</sup> Includes arsenic, barium, cadmium, chromium, fluoride, mercury, selenium, combined radium-226, -228, and gross alpha particle activity.

		SDWA-Related Need			
State	D/DBPR	ESWTR	Information Collection Rule	Subtotal	Distribution Improvement (TCR)
Alabama	174.2	97.8	0.7	272.7	372.
Alaska	25.4	17.5	0.1	43.0	226.8
Arizona	94.3	46.8	0.7	141.8	271.2
Arkansas	116.7	73.9	0.5	191.2	643.6
California	1,037.3	593.7	10.1	1,641.1	3,868.9
Colorado	157.9	108.6	1.1	267.6	421.8
Connecticut	113.9	71.1	0.8	185.9	531.4
Delaware	24.1	11.2	0.2	35.5	153.2
District of Columbia	7.3	5.2	0.1	12.7	75.6
Florida	280.6	56.8	3.1	340.5	1,135.3
Georgia	260.2	148.9	1.8	410.8	769.5
Hawaii	14.7	1.7	0.1	16.5	59.4
Idaho	28.1	10.4	0.1	38.5	183.6
Illinois	488.3	295.1	2.8	786.2	1,455.3
Indiana	148.0	70.8	0.9	219.7	619.6
lowa	95.4	41.8	0.6	137.8	486.8
Kansas	92.1	61.1	0.5	153.7	632.8
Kentucky	193.4	143.0	1.0	337.4	484.8
Louisiana	174.1	75.0	1.1	250.1	626.8
Maine	39.9	25.4	0.2	65.5	371.0
Maryland	66.1	35.3	0.5	101.9	332.5
Massachusetts	314.3	183.6	2.1	499.9	1,816.3
Michigan	362.8	221.4	2.5	586.7	1,335.4
Minnesota	91.9	26.8	0.4	119.1	536.9
Mississippi	77.6	7.4	0.1	85.0	637.2
Missouri	131.7	63.9	0.6	196.2	557.4
Montana	34.0	19.4	0.2	53.5	251.9
Nebraska	33.0	7.2	0.1	40.3	262.9
Nevada	49.0	30.8	0.4	80.2	75.8
New Hampshire	41.2	24.2	0.2	65.6	237.3
New Jersey	233.6	113.2	1.6	348.4	1,127.8
New Mexico	27.4	7.2	0.1	34.7	267.2
New York	390.7	241.1	2.4	634.3	2,485.9
North Carolina	244.3	149.3	1.4	395.0	737.9
North Dakota	36.1	21.0	0.3	57.3	220.1
Ohio	349.1	184.5	2.4	535.9	1,321.3
Oklahoma	140.0	106.6	0.8	247.3	604.7 455.4
Oregon Pennsylvania	106.0 438.9	65.2 277.9	0.5 2.8	171.6 719.7	
Puerto Rico	134.2	85.9		220.8	1,661.5 137.6
Rhode Island	56.3	36.8	0.8	93.6	238.3
South Carolina					
South Carolina South Dakota	154.0 29.6	93.8 15.6	0.8 0.1	248.6 45.3	261. <sup>-</sup> 146. <sup>:</sup>
	182.5	118.0	0.8	301.4	363.2
Tennessee Texas	793.4	482.8	5.3	1,281.6	2,700.8
Utah	120.7	74.5	0.9	1,261.6	2,700.8
Vermont	28.5	17.7	0.9	46.3	159.3
Virginia	236.8	159.7	1.8		524.8
Washington	166.1	72.1	0.8	398.3 238.9	1,281.4
West Virginia	74.8	60.2	0.3	135.3	330.3
Wisconsin	142.9	60.6	1.0	204.5	582.8
Wyoming	33.2	24.4	0.2	57.7	104.3
Subtotal	8,886.3	5,043.9	59.2	13,989.4	35,463.5
American Samoa	0.8	0.7	0.0	1.4	4.9
Guam	3.3	1.1	0.0	4.4	30.2
Northern Mariana Is.	0.5	0.0	0.0	0.5	3.4
Virgin Islands	4.0	7.6	0.0	11.6	58.4
Subtotal	8.5	9.3	0.0	17.9	96.9
Total	8,894.9	5,053.2	59.2	14,007.3	35,560.4
i Otal	0,004.0	J,UJJ.2	JJ.Z	14,007.3	33,300.4

Permafrost conditions and arctic temperatures make water system construction in Alaska Native communities challenging. A utilidor, shown to the right, houses drinking water distribution mains. Often distribution mains cannot be placed underground because ice-rich permafrost soils can be unstable and burying the lines is not cost effective. Above ground, piping must be insulated from arctic conditions. Even when pipes are insulated, the water must be circulated and heated with diesel boilers to prevent freezing. When a community does not have a distribution system that delivers water to households, residents must haul water from a watering point like the one shown below. The danger of contamination is significant because the water is hauled on the same board walk used to carry away human waste.





## Exhibit B-6: (facing page)

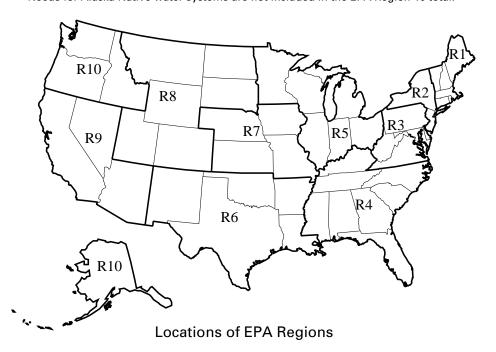
Total Need for American Indian and Alaska Native Water Systems by EPA Region

The needs for American Indian and Alaska Native water systems totals \$1.3 billion.

Exhibit B-6: **Total Need for American Indian and Alaska Native Water Systems** by EPA Region (20-year need in millions of Jan. '95 dollars) **EPA Region Total Need** 0.3 Region 1 Region 2 1.8 Region 3 1 Region 4 15.6 Region 5 41.2 Region 6 34.5 Region 7 5.7 Region 8 95.5 Region 9 <sup>2</sup> 320.5 Region 10<sup>3</sup> 45.5 Alaska Native Systems 772.0 Total 1,332.6

Note: Numbers may not total due to rounding.

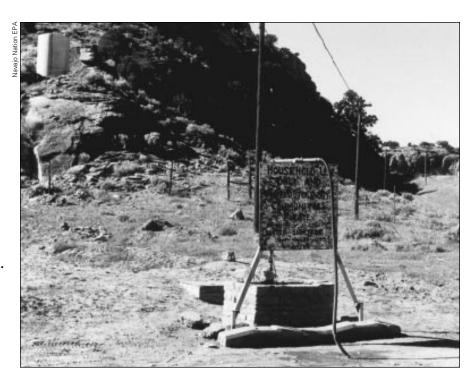
<sup>&</sup>lt;sup>3</sup> Needs for Alaska Native water systems are not included in the EPA Region 10 total.



<sup>&</sup>lt;sup>1</sup> There are no American Indian water systems in EPA Region 3.

<sup>&</sup>lt;sup>2</sup> Navajo water systems are located in EPA Regions 6, 8, and 9, but for the purposes of this report, all Navajo needs are shown in EPA Region 9.

Many American Indians get their drinking water from watering points. The Shonto watering point, pictured to the right, provides water to over 400 Navajo people. Residents use trucks to haul water to their homes up to 15 miles away. The sign at the watering point states that there is a water shortage and asks that the water be used for household purposes only. Hauled water is vulnerable to microbiological contamination. The fill hose, as well as containers for storage and transport, can cause contamination. The pump jack at Burnham, shown below, operates a watering point that serves 150 Navajo people. The pump jack is solar powered, but has a diesel backup for cloudy days. Fuel stored in the metal tank poses a direct threat of contamination to the aquifer and the well. The Navajo Nation EPA is working with both communities to improve sanitary conditions and safety precautions.





#### Exhibit B-7: (facing page)

Need by Category for American Indian and Alaska Native Water Systems

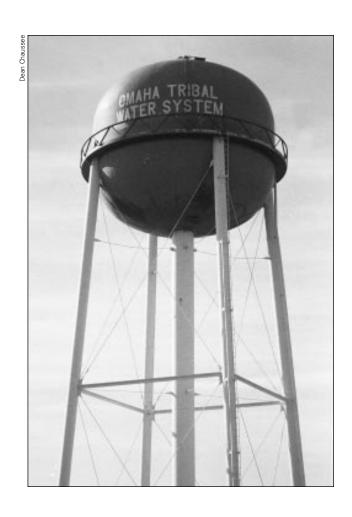
Approximately \$1.1 billion is needed now to address problems that pose public health risks. Almost \$0.2 billion is needed in the future to ensure the availability of safe drinking water over the next 20 years.

Exhibit B-7: Need by Category for American Indian and Alaska Native Water Systems (20-year need in millions of Jan. '95 dollars)

Category of Need	Current Need	Future Need	Total Need
Transmission and Distribution	606.8	42.5	649.3
Treatment	186.2	92.8	279.0
Storage	239.2	34.4	273.7
Source	72.7	25.3	98.0
Other	31.2	1.5	32.7
Total	1,136.1	196.5	1,332.6

Note: Numbers may not total due to rounding.

If adequate storage is not available, the distribution system can lose pressure. This condition is dangerous because it can lead to contaminants being drawn into the distribution system. The elevated tank, shown to the right, is severely corroded and should be replaced. In some cases, systems replace elevated storage tanks with stand pipes, pictured below. These stand pipes have recently been constructed on a hillside at Polacca, a Hopi community in Arizona. Even without the hillside location, these cost-effective tanks can be tall enough to pressurize a water system and hold substantial reserves of water.





#### Exhibit B-8: (facing page)

Total SDWA and SDWA-Related Need for American Indian and Alaska Native Water Systems

For American Indian and Alaska Native water systems, the need for compliance with existing SDWA regulations is \$96.6 million, approximately \$75.6 million of which is needed now. A total of \$26 million is for compliance with proposed SDWA regulations. Another \$185 million is for SDWArelated need.

Exhibit B-8: Total SDWA and SDWA-Related Need for American Indian and Alaska Native Water Systems (20-year need in millions of Jan. '95 dollars)

Regulation	Current Need	Total Need					
Existing Regulations							
Regulations for Contaminants with Acute Health Effects <sup>1</sup>	74.8	21.0	95.8				
Regulations for Contaminants with Chronic Health Effects <sup>2</sup>	0.8	_	0.8				
Subtotal	75.6	21.0	96.6				
Proposed Regulations							
Disinfectants and Disinfection Byproducts Rule	_	18.0	18.0				
Enhanced Surface Water Treatment Rule	-	8.0	8.0				
Information Collection Rule <sup>3</sup>	_	_	_				
Subtotal	_	26.0	26.0				
SDWA-Related Need							
Distribution Improvements (TCR)	174.4	10.9	185.3				

Note: Numbers may not total due to rounding.

Regulations for contaminants with acute health effects include the Surface Water Treatment Rule, the Total Coliform Rule, and the nitrate standard.

<sup>&</sup>lt;sup>2</sup> Regulations for contaminants with chronic health effects include the Lead and Copper Rule, the Phase I, II, and V rules, and safety standards for TTHMs, arsenic, barium, cadmium, chromium, fluoride, mercury, selenium, combined radium-226, -228, and gross alpha particle activity.

<sup>&</sup>lt;sup>3</sup> No capital costs are associated with the ICR for American Indian and Alaska Native water systems.